Information resources at a national and international level are growing at a faster rate than the ability of local medical libraries and medical institutions to use them.

Disseminating information about the latest technology developments to health information providers and health professionals;

Facilitating and supporting medical informatics research efforts throughout the region;

Serving as resource points for information about NLM grants; and

Providing an annual technology update from NLM.

D. Improve the RML Network's ability to serve increased numbers of health professionals by:

Reviewing the current RML mission and goal statements for possible modifications to emphasize the Network's increasing role in actively reaching health professionals;

Studying the configuration of the RML Network, in light of its new emphasis, for possible modification;

Changing the name of the network to reflect its national structure and direction;

Improving the understanding of each RML Regional Advisory Committee of national services and priorities; and

Improving the communications among network members and with NLM.

Recommended Resources. The following table shows recommended appropriations to strengthen the RML Program. Although additional funds are required in FY 1990 for the planning and contract award phases, the major increment is scheduled for FY 1991 because of the timing of the RML contract cycle.

Incremental Dollars in Millions

Regional Medical Library Network

	FY 90	FY 91	FY 92	FY 93	FY 94
Assist in connecting health professionals	$1.0	$2.0	$2.2	$2.5	$3.0
Improve capabilities of libraries in network	0.0	1.5	1.6	2.0	2.0
Encourage technology transfer/research	0.0	2.0	2.2	2.5	2.5
Improve ability to serve more health professionals	1.0	0.5	0.5	0.5	0.5
Total	**$2.0**	**$6.0**	**$6.5**	**$7.5**	**$8.0**
FTEs[17]	3	3	3	3	3

2. Strengthening Hospital Access to National Information Sources

The Challenge. Information resources at a national and international level are growing at a faster rate than the ability of local medical libraries and medical institutions to use them. Shrinking library holdings and collections at the local level, the lack of communications specialists in smaller institutions, and the scarcity of appropriate communications equipment and computers locally are creating a grave danger of isolation of local medical facilities from the growing national—and even international—information capability.

Resource Grants to Small Hospital Libraries

At the local level, NLM has implemented a new generation of Resource Grants to significantly improve the access of community-based hospital libraries to information. The evolution of the Resource Grant Program has consistently mirrored changing national needs and evolving technological capabilities. Today, Information Access Grants are

directed primarily to small and medium-sized hospital libraries, the institutions to which health-care professionals turn most often for access to biomedical publications and electronic bibliographic databases. The emphasis is on supporting projects that take advantage of modern electronic and telecommunications technologies to improve access by local libraries to national information resources.

Training health professionals to use these technologies, such as GRATEFUL MED for searching MEDLINE, is an important component of this new initiative. Access to MEDLINE information has proven to be cost-effective and can be life-saving. It has even been proposed by some that the costs of computerized literature searches be eligible for third-party reimbursement in order to encourage their more widespread use.[13]

Successful "Access" grant projects will serve as models that can be used by other community-based institutions; they must be funded at a level that will enable this vital leverage to occur.

Integrated Academic Information Management Systems (IAIMS)

In 1983, NLM launched a major initiative in institution strengthening—the IAIMS Program. It sought to catalyze a new computer-supported information management environment in biomedical teaching and research institutions. Funding is directed toward the institution-wide use of communications and information processing technologies to link and relate library systems with individual and institutional databases and files—inside and outside the institution—for patient care, research, education, and administration. The goal is to create an organizational mechanism within health institutions to manage biomedical knowledge more effectively, and to provide for a system of comprehensive information access. A related goal is to strengthen and to position the institutional libraries to assume crucial and evolving functions in a new information-intensive era. The program requires an institution to follow three sequential phases: I.) a planning phase of about two years; II.) a prototyping phase (of about three years) to explore and introduce technologies; and III.) an implementation phase of five years to introduce a networked and coordinated information and communications program. The original funding formula envisioned twenty Phase I planning grants; ten Phase II prototype development grants; and five Phase III full scale implementations. To date, seven institutions have been funded at the Phase I level, five at Phase II, and two at Phase III.

In 1988, NLM assembled a grants review committee to evaluate several of the IAIMS applications and to appraise the status of the program. The committee's report was an enthusiastic reaffirmation of the IAIMS concept, not only in achieving considerable information integration but also in catalyzing important changes in institutional behavior. There is no single IAIMS model: the unexpectedly diverse implementations reflect the wide differences in institutions. A principal barrier to an even more complete realization of the IAIMS concept has been inadequate funding which, in the current fiscal year, has permitted the support of only two institutions at the third and final implementation phase, with no new awards to institutions planning an IAIMS program (Phase I), or developing a prototype (Phase II).

The Outreach Panel is impressed with the success of the IAIMS Program in improving information access for institution-based health professionals. The Panel strongly endorses and supports the recommendations contained in the review committee's report and the need to capitalize on the program's successes to date.

NLM should strengthen and facilitate local institutions' access to national biomedical information sources.

Participation in National Networks

Strengthening access to national information sources must include building connections to the developing national networks—the interstate "highways" capable of carrying electronic information "traffic" to all health professionals in all settings. Rural practitioners may experience isolation from the mainstream of American medicine. They face high communications costs that cannot be offset by high volume links in low population densities; in fact, there are no nodes for high speed value-added networks (VANs) in small towns.

At the other extreme, urban health professionals, who may routinely need to access information from numerous workplaces and several different computer systems, are prime candidates for a technological solution. Electronic gateways and networks, computers linking users' computers to other computers, automatically and invisibly, represent a breakthrough in automation that can be applied to keep the health professional in touch with knowledge as he or she moves from task to task, database to database, setting to setting.

The idea that the nation's scientists ought to be linked in a master computer network—to each other, to computing power, and to information sources—is not a new one. The ready acceptability of personal computers now makes this possible, but coordinated planning of hardware, software, and communications protocols is necessary. There are many institutional, regional, and national networks. Some of these networks, including ARPANET (the Department of Defense research network), BITNET (a national network of computers at universities and research organizations), and NSFNET (sponsored by the National Science Foundation), are part of a collection of interconnected networks called Internet.

NSFNET is to be the national research network. It includes the NSFNET backbone, several mid-level networks, including the network linking the five NSF-funded supercomputers and some regional networks, and campus networks. NSF has taken informal "lead agency" responsibility to design a future network that will have the additional capacity for transmission of images. NLM should participate in this planning, so as to ensure fulfillment of the biomedical community's need for access to these advanced communications networks and to reflect biomedical priorities as the design options are taken.

Recommended Action. *NLM should strengthen and facilitate local institutions' access to national biomedical information sources by:*

- *Assisting local institutions in gaining access to networks by substantially expanding its extramural resource grant program of "Access" grants. This support program should be undertaken at a level not less than an additional $2 million in FY 1990.*
- *Seeking substantially increased funding for the IAIMS Program to assist a larger number of institutions that are planning for integrated information services, and to insure sufficient models to accommodate the diversity of IAIMS sites. Present Phase I and Phase II programs (that promise new models for implementation) should be brought to completion; and, most important, Phase III implementation projects should be supported. Funding in subsequent years should support meritorious new applications and proposed models at levels equal to those originally planned. Incremental funding at a level of $6 million in FY 1990 is essential.*

- *Assuring biomedical participation in current NSFNET developments and in planning for future advanced electronic communications networks to assure health professionals' access to biomedical information. Incremental funding at a level of $1 million in FY 1990 is required.*

Actual and Recommended IAIMS Awards

Phase	I	II	III
Original goal	*(20)*	*(10)*	*(5)*
Actual No. through FY 89	7	5	2
New Awards FY 90-94	13	5	5
Total # Recommended through FY 94	20	10	7

Following are the detailed actions that will accomplish this recommendation:

A. Resource "Access" Grants: encourage access grant applications by community-based institutions, including those in underserved areas serving minority populations.

B. IAIMS grants: fund an additional thirteen Phase I, five Phase II, and five Phase III awards in FY 1990, for a total of twenty Phase I awards, ten Phase II awards, and seven Phase III awards by FY 1994. Historically black institutions should be informed of the opportunities inherent in the IAIMS concept.

C. Implement a formal program to support the training of IAIMS professionals with the requisite technical expertise and organizational skills to accept IAIMS leadership roles at their institutions.

D. Encourage and support the exchange of information among current IAIMS participants. The expansion of the IAIMS symposium series is one way of doing this.

E. Establish linkages to connect academic health science centers to existing national scientific and educational networks such as NSFNET.

F. Through national networks, develop an electronic gateway function that will link users of NLM databases in all settings to information in a variety of relevant databases.

Recommended Resources. To summarize resources required for strengthening hospital access to national information sources:

Incremental Dollars in Millions

Strengthening Hospital Access to National Information Sources

	FY 90	FY 91	FY 92	FY 93	FY 94
Resource Grants	$2.0	$3.0	$4.0	$5.0	$6.0
IAIMS					
Phase I/II/III awards	5.0	6.0	7.0	8.0	9.0
Training	0.5	0.5	0.5	0.5	0.5
Information interchange	0.5	0.5	0.5	0.5	0.5
Subtotal, IAIMS	6.0	7.0	8.0	9.0	10.0
National Networks	1.0	1.5	2.0	2.5	2.5
Total	**$9.0**	**$11.5**	**$14.0**	**$16.5**	**$18.5**
FTEs	3	3	3	3	3